

Cerulean Warbler (*Setophaga cerulea*) Species Guidance

Family: Parulidae – the wood-warblers

State Status: [Threatened](#) (1989)

State Rank: [S2S3B](#)

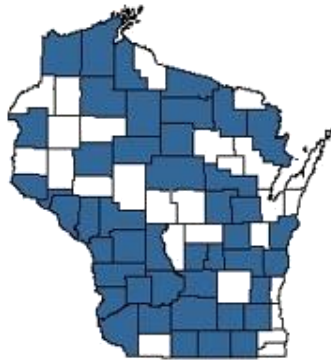
Federal Status: [None](#)

Global Rank: [G4](#)

Wildlife Action Plan

Mean Risk Score: [4.1](#)

Wildlife Action Plan Area of Importance Score: [2](#)



Counties with documented locations of Cerulean Warbler breeding or breeding evidence in Wisconsin. Source: Natural Heritage Inventory Database, June 2011.



Photo by Dennis Malueg

Species Information

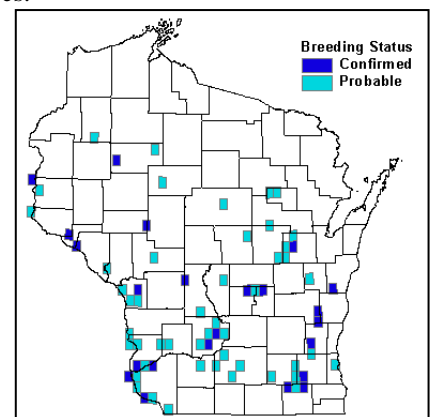
General Description: The Cerulean Warbler is a small songbird (11.5 cm [4.5 in]) with long, pointed wings and a short tail. Sexes are dimorphic in both basic and alternate plumages. Both sexes have two broad white wing bars, white tail spots, and dark streaking down the side and flanks. Males have sky-blue head and upperparts, blackish wings and tail, blackish streaking on back, and narrow blue-gray chest band. Females have blue-green head and upperparts, a prominent pale supercilium (stripe above the eye), and underparts that are typically washed with pale yellow. Females also lack blackish streaking on the back. Immatures resemble females (Howell and Webb 1995, Dunn and Garrett 1997).

The song is composed of three parts: a long introductory section and shorter middle section on the same pitch, followed by a final buzz on a higher pitch. Songs can be described as ZEE ZEE ZEE ZIZIZIZI ZZZEEET (Flaspohler 1993, Hamel 2000a). An example of a typical song can be heard here: http://www.allaboutbirds.org/guide/Cerulean_Warbler/sounds

Definitive Identification: The upperparts of all but the immature females have distinctive bluish tones. The small size, short-tailed appearance, prominent supercilium, and absence of back streaks help to distinguish adult and immature female Cerulean Warblers from other similar species (Dunn and Garrett 1997).

Similar Species: Females and immature male Cerulean Warblers resemble immature female Blackburnian Warblers (*Setophaga fusca*). However, immature Blackburnian Warblers have a longer tail and a darker, more triangular cheek patch than immature Cerulean Warblers. Also, immature Blackburnian Warblers generally appear buffy below, whereas immature Cerulean Warblers have whitish underparts washed with yellow (Dunn and Garrett 1997, Hamel 2000a). In Wisconsin, Cerulean and Blackburnian Warblers are more likely to co-occur during migration than during the breeding season. Additionally, Blackburnian Warblers prefer forest stands dominated by coniferous species whereas Cerulean Warblers prefer deciduous forest types.

Associated Species: Within appropriate floodplain forest habitats in Wisconsin, Cerulean Warblers may occur with the following Species of Greatest Conservation Need: Yellow-crowned Night-Heron (*Nyctanassa violacea*), Red-shouldered Hawk (*Buteo lineatus*), Yellow-billed Cuckoo (*Coccyzus americana*), Kentucky Warbler (*Geothlypis formosa*), Yellow-throated Warbler (*Setophaga dominica*), and Prothonotary Warbler (*Protonotaria citria*). Within upland hardwood forest types, Cerulean Warblers can occur with the following Species of Greatest Conservation Need: Yellow-billed Cuckoo, Acadian Flycatcher (*Empidonax virens*), Wood Thrush, Worm-eating Warbler (*Helminthos vermivorum*), Louisiana Waterthrush (*Seiurus motacilla*), Kentucky Warbler, and Hooded Warbler (*Wilsonia citrina*).



Cerulean Warbler Breeding Locations from Wisconsin's Breeding Bird Atlas. (Cutright et al. 2006)

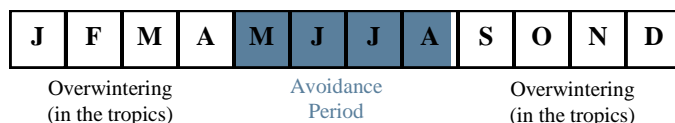
State Distribution and Abundance: Cerulean Warblers breed sparingly throughout the southern three-fourths of the state, as indicated on map to the right (source: Cutright et al. 2006), and occur in scattered localities in the northern counties (Mossman 2006). Highest concentrations of this species occur in the Baraboo Hills, the floodplain and bluffside forests of the lower Wisconsin and Mississippi River corridors, the Blue Hills, Straight Lake, both units of the Kettle Moraine State Forest, and in many scattered areas in the Western Coulee and Ridges Ecological Landscape, which needs more inventory (Flaspohler 1993, Mossman 2006). Distribution information for this species may not reflect its full extent in Wisconsin because many areas of the state have not been thoroughly surveyed.

Global Distribution and Abundance: The Cerulean Warbler's summer range extends eastward from the Great Plains in eastern North and South Dakota, Nebraska, Kansas, and Oklahoma; south to Arkansas, Mississippi, Tennessee, northern Alabama and Georgia, and South Carolina; north to Massachusetts, southern Quebec, southeastern Ontario, Michigan, Wisconsin, and central Minnesota. Within this range, highest densities occur in eastern Tennessee, eastern Kentucky, southern and western West Virginia, southeastern Ohio, and southwestern Pennsylvania (USFWS 2012).

The winter range extends from northern Columbia and Venezuela south along a narrow band of evergreen forest at approximately 500-2000 m (1650-6550 ft) elevation in eastern Ecuador, eastern Peru, and northwestern Bolivia (Flaspohler 1993, USFWS 2007).

Diet: Cerulean Warblers are primarily insectivorous, preferring bees and wasps (*Hymenoptera*), caterpillars (*Lepidoptera*), beetles (*Coleoptera*), and true bugs (*Hemiptera*) (Hamel 2000b, USFWS 2012).

Reproductive Cycle: Cerulean Warblers arrive in Wisconsin from late April to late May. Although Wisconsin breeding records are scarce due to the difficulty of finding nests, one nest with eggs was found on June 17, nests with young were documented from June 23 to July 1 (Robbins 1991), and adults feeding young were observed from June 20 to July 28 (Mossman 2006). Cerulean Warblers depart Wisconsin by late August (Robbins 1991).

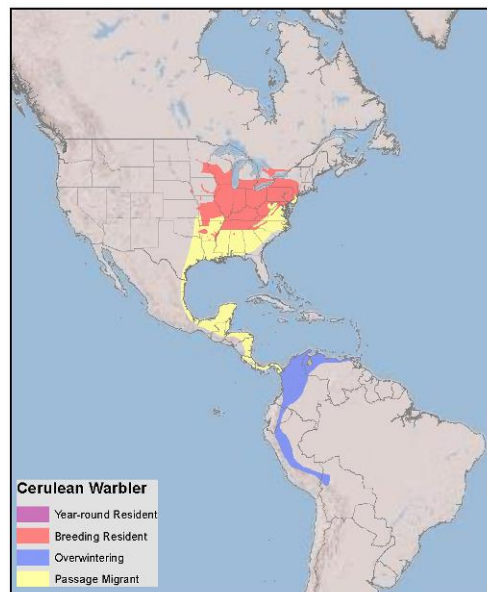


Ecology: Cerulean Warblers forage in the upper canopy of mature hardwood forests, and are more often heard than seen. Foraging heights range from 2-45 m (6.5-150 ft), and average 15 m (50 ft) in Tennessee and Arkansas (Hamel 2000a, b). This species gleans insects from the bases of leaves and small branches and, less commonly, hovers at the underside and outer edge of foliage (Hamel 2000a, USFWS 2012). Cerulean Warblers use a variety of trees for foraging and apparently do not prefer any particular tree species (Hamel 2000a).

Cerulean Warblers are nocturnal migrants that fly more than 4000 km (2500 miles) from eastern North America to northern South America (USFWS 2007). In the spring, they apparently depart the wintering grounds and move north through Panama, Costa Rica, and Belize, and then across the Gulf of Mexico to the Gulf Coast of the U.S., continuing on to their breeding grounds. This pattern is likely reversed during fall migration (Hamel 2000b).

Nests are often built in large deciduous trees such as basswoods (*Tilia americana*), elms (*Ulmus* spp.), maples (*Acer* spp.), and especially oaks (*Quercus* spp.) at heights of 4.5-30 m (15-100 ft), but most commonly 10-20 m (30-65 ft) (Hamel 2000b). Nests are located in the middle and upper branches, and concealed from above by clumps of leaves from other branches or vines (Hamel 2000b, USFWS 2012). Female Cerulean Warblers build shallow cup-nests composed of fine grasses, plant fibers, bark strips, and weed stems (Flaspohler 1993).

The female lays and incubates 2-5 eggs, and average clutch size is four. Incubation lasts from 11-12 days, with chicks fledging 9-11 days after hatching (Flaspohler 1993, Hamel 2000b). This species typically raises only one brood but may re-nest if the first attempt fails (Hamel 2000b).



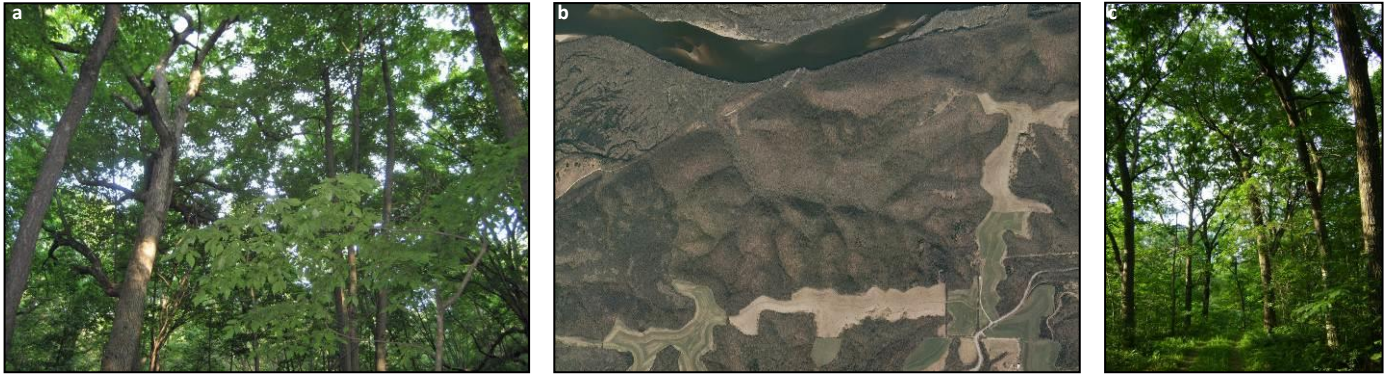
Global range map for Cerulean Warbler.
(NatureServe 2013)

Natural Community Associations ([WDNR 2005](#), [WDNR 2009](#)):

Significant: [floodplain forest](#), [southern dry-mesic forest](#)

Moderate: oak woodland, southern mesic forest

Minimal: none



Photos (left to right): a) Cerulean Warbler habitat in Sheboygan County, Rich Staffen, Wisconsin DNR; b) this large (> 600 acres) block of dry-mesic forest in Grant County supports numerous breeding pairs of Cerulean Warbler and associated rare forest interior birds, Photo acquired in 2010; and c) Cerulean Warbler habitat in Columbia County. © B. Collins

Habitat: The Cerulean Warbler breeds in wet-mesic to dry-mesic habitats that contain large deciduous trees (Flashpohler 1993, Mossman 2006). In Wisconsin, this species occurs in mature upland and lowland hardwood forests, especially oak-hickory and maple forest types (Mossman 2006). Habitat measures such as canopy cover, tree species composition, stand age, and tract size vary considerably across its range (Hamel 2000b). In eastern Ontario, male Cerulean Warbler territories were characterized by large trees approximately 15-17 m (49-56 ft) tall and dense foliage cover (45% cover) in the 12-18 m (39-59 ft) height category (Jones and Robertson 2001). In southeastern Ontario, nest trees had an average height of 17.7 m (58 ft) and an average diameter at breast height (DBH) of 40.2 cm (15.8 in) (Oliarnyk and Robertson 1996). In Wisconsin, Cerulean Warblers are more likely to occur in woodlots at least 200 acres (Temple 1988). In the Baraboo Hills, this species is associated with sites containing many large (> 40 cm [15.7 in] DBH) trees, > 65% canopy cover, and small canopy gaps (Mossman and Lange 1982).

Threats: The largest threat to Cerulean Warblers comes from the fragmentation and loss of existing large patches of older deciduous forest (Flashpohler 1993), and the continuing decline of oaks, especially white oak (*Quercus alba*). Loss of appropriate vegetation structure within mature deciduous forests is also a concern because it may reduce this species' reproductive success (USFWS 2007). Habitat loss and degradation on the wintering grounds is a significant issue and is implicated in the decline of this species. Clearing primary forests for agriculture and livestock grazing in the Andes Mountains not only directly limits habitat availability but also degrades the quality of the surrounding landscape. This impact may in turn reduce over-winter survival rates or affect survival during migration due to diminished body conditions. Loss of migratory stopover habitat in Central America and along the Gulf Coast of the U.S. also is a threat that can result in decreased survival (USFWS 2007).

Climate Change Impacts: Climate change models for Cerulean Warbler have low model reliability, so projected distribution and abundance changes should be interpreted with caution. In Wisconsin, projected declines in soil moisture may reduce suitable growing conditions for floodplain forests but improve conditions for oak-hickory forests (Swanston et al. 2011, WICCI 2011). Based on these projections, Cerulean Warblers would be expected to shift their distribution to correspond with the expansion of oak-hickory forests in the state, wherever landscape connectivity and propagule (seed) availability allow such expansion. Potential impacts of climate change include a decrease in abundance, a northward shift in continental distribution (Matthews et al. 2004), and changes in the springtime emergence phenology of insect prey (USFWS 2007, WICCI 2011).

Survey Guidelines: Persons handling Cerulean Warblers must possess a valid [Endangered and Threatened Species Permit](#). If surveys are being conducted for regulatory purposes, survey protocols and surveyor qualifications must first be approved by the Endangered Resources Review Program (see *Contact Information*). Area searches are effective for surveying Cerulean Warblers in forest stands < 100 acres. Survey the entire affected area that contains suitable Cerulean Warbler nesting habitat (see "Habitat" section above), by walking slowly throughout the area and stopping occasionally to listen for Cerulean Warbler vocalizations. Point counts can be used for stands > 100 acres, and require that the observer stand in one spot for 10 minutes and record all birds seen or heard within a 100-m (330-ft) radius. Point-count stations should be placed a minimum of 250 m (820 ft) apart. For either the area-search or point-count method, record the following data: all Cerulean Warblers seen or heard, numbers of pairs and juveniles, behavioral observations such as courtship displays or food carries, and other Species of Greatest Conservation Need that are present at the site. Whenever possible, also map the approximate territory boundaries.

Carry out surveys between June 1 and July 4, preferably 10 days apart, and including at least one survey < 1 week prior to any proposed project activity that may impact Cerulean Warblers (see *Screening Procedures*). Begin surveys within 15 minutes of sunrise and complete them within four hours, or no later than 10 am. Conduct surveys during appropriate weather, i.e., no fog, rain, or wind > 10 mph (Ralph et al. 1993). Personnel conducting surveys must be able to identify Cerulean Warblers by sight and sound. At least

three surveys conducted with the above protocol and yielding negative results are needed to determine that the species is not present at a site for the purposes of these guidelines.

Summarize results, including survey dates, times, weather conditions, number of detections, detection locations, and behavioral data and submit via the WDNR online report: <<http://dnr.wi.gov>, keyword “rare animal field report form”>.

Management Guidelines

The following guidelines typically describe actions that will help maintain or enhance habitat for the species. These actions are not mandatory unless required by a permit, authorization or approval.

Cerulean Warbler conservation in Wisconsin requires protection, restoration and management of forest stands > 200 acres within appropriate ecological landscapes, including [central sand plains](#), [southeast glacial plains](#), [western coulee and ridges](#) (WDNR 2005), [forest transition](#), and [north central forest](#) (E. Epstein pers. comm.). Within these landscapes, key conservation sites include the extensive floodplain forests along the Lower Wisconsin, Lower Wolf, Lower Black, Lower Chippewa, and Lower St. Croix rivers (E. Epstein pers. comm.), the floodplain and bluffsides forests of the Mississippi River corridor, Lake LaGrange (Rosenberg et al. 2000), both units of the Kettle Moraine State Forest, and deciduous forest tracts in the Baraboo Hills (Mossman 2006).

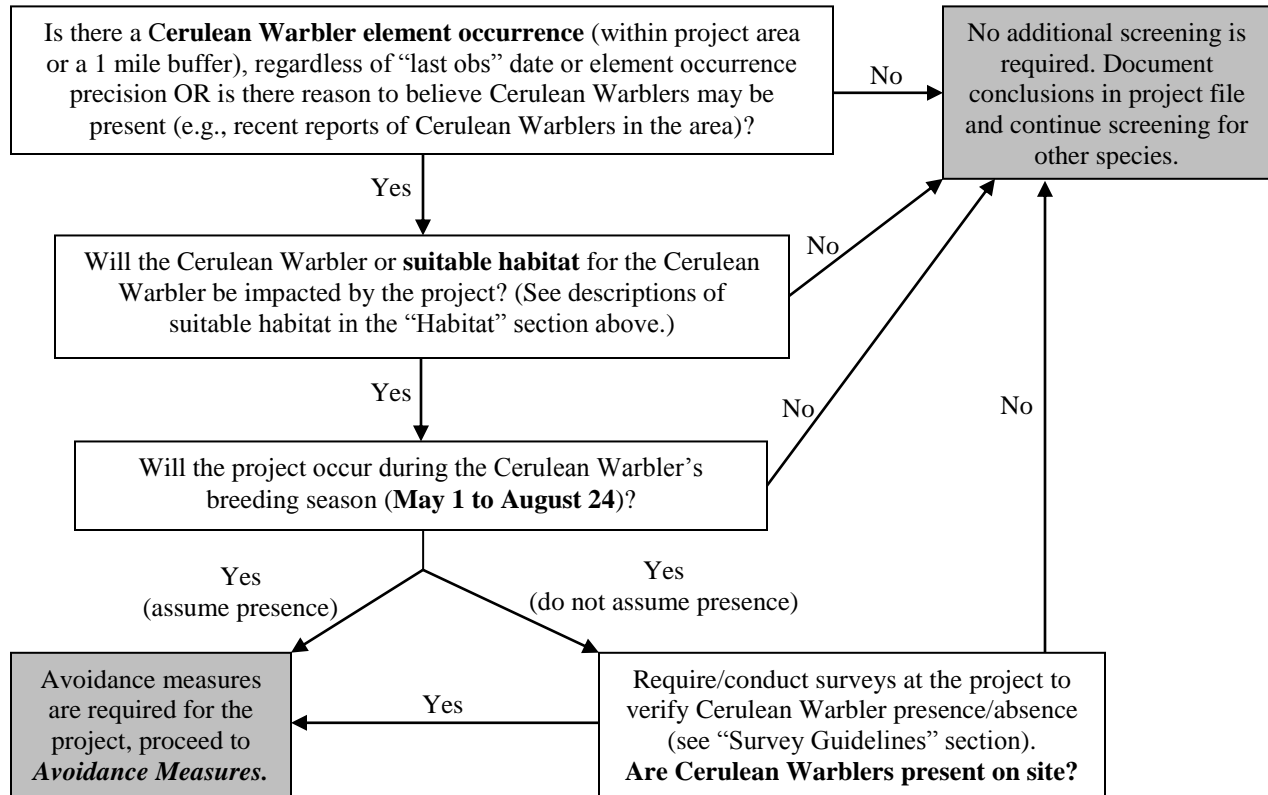
Appropriate management decisions depend on landscape context and site-specific characteristics. Landscapes that provide the highest reproductive potential for Cerulean Warblers contain at least 50% forest cover and ideally > 70% forest cover within a 10-km (6-mi) radius, as well as high levels of forest connectivity (Buehler et al. 2008, DAI 2008). Landscapes containing < 50% forest cover within a 10-km (6-mi) radius have a low potential for Cerulean Warbler conservation (DAI 2008). Non-forested or agriculture-dominated landscapes have been shown to have greater nest parasitism and predation rates for forest birds (Robinson 1995, Buehler et al. 2008).

Within landscapes containing > 50% forest cover, establish connecting corridors between existing forest stands and provide structural complexity within the forest canopy by retaining snag trees and large trees that are > 21 m (70 ft) tall and > 40 cm (15.7 in) DBH (Oliarnyk and Robertson 1996, Jones and Robertson 2001, DAI 2008). Use timber harvesting techniques that result in regeneration of oaks, especially white oak, and preservation of large oak trees (M. Mossman pers. comm.). Deer browse can depress oak regeneration and severely limit habitat in some areas, and consideration should be given to lowering deer densities or otherwise protecting habitats from browse in designated conservation areas for this species. Small (< 80 ha), isolated forest stands typical of the agricultural landscapes of southern Wisconsin are generally too small to be suitable Cerulean Warbler habitat and are better managed either for species that can survive in “smaller” woodlots or in some cases redirected towards oak savanna regeneration (Brawn 2006). Evaluating regional bird communities before starting management actions may help to identify the most appropriate management objectives for isolated forest stands within a non-forested landscape.

Screening Procedures

The following procedures must be followed by DNR staff reviewing proposed projects for potential impacts to the species.

Follow the “Conducting Endangered Resources Reviews: A Step-by-Step Guide for Wisconsin DNR Staff” document (summarized below) to determine if Cerulean Warbler will be impacted by a project (WDNR 2012):



Avoidance Measures

The following measures are specific actions required by DNR to avoid take (mortality) of state threatened or endangered species per Wisconsin’s Endangered Species law (s. 29.604, Wis. Stats.) These guidelines are typically not mandatory for non-listed species (e.g., special concern species) unless required by a permit, authorization or approval.

According to Wisconsin’s Endangered Species Law (s. 29.604, Wis. Stats.), it is illegal to take, transport, possess, process, or sell any wild animal on the Wisconsin Endangered and Threatened Species List (ch. NR 27, Wis. Admin. Code). Take of an animal is defined as shooting, shooting at, pursuing, hunting, catching or killing.

If *Screening Procedures* above indicate that avoidance measures are required for a project, follow the measures below. If you have not yet read through *Screening Procedures*, please review them first to determine if avoidance measures are necessary for the project.

1. The simplest and preferred method to avoid take of Cerulean Warblers is to avoid directly impacting individuals, known Cerulean Warbler locations, or areas of suitable habitat (described above in the “Habitat” section and in *Screening Procedures*).
2. If Cerulean Warbler impacts cannot be avoided entirely, avoid impacts during the **breeding season (May 1 to August 24)**.
3. If Cerulean Warbler impacts cannot be avoided, please contact the Natural Heritage Conservation Incidental Take Coordinator (see *Contact Information*) to discuss possible project-specific avoidance measures. If take cannot be avoided, an [Incidental Take Permit or Authorization](#) is necessary.

Additional Information

References

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Linked Websites:

- USFWS Species of Conservation Concern Website: <<http://www.fws.gov/midwest/es/soc/birds/cerw/index.html>>
- USFWS Cerulean Warbler Status Assessment: <<http://library.fws.gov/Pubs3/statusass/ceruleanwarbler.pdf>>
- Cerulean Warbler Technical Group subcommittee: <<http://www.srs.fs.usda.gov/egc/index.html>>
- Cerulean Warbler Atlas Project: <<http://www.birds.cornell.edu/cewap/>>
- Cornell Lab of Ornithology All About the Birds: <http://www.allaboutbirds.org/guide/Cerulean_Warbler/lifehistory>
- Driftless Area Initiative Forest Interior Bird Guide: <http://www.driftlessareainitiative.org/pdf/Managing_from_a_Landscape_Perspective_Web_Version_1_1.pdf>
- Natural Communities of Wisconsin: <<http://dnr.wi.gov>, key word "natural communities">
- Rare Animal Field Report Form: <<http://dnr.wi.gov>, key word "rare animal field report form">
- Wisconsin Bird Conservation Initiative All Bird Conservation Plan: <<http://www.wisconsinbirds.org/plan/species/cerw.htm>>
- Wisconsin Wildlife Action Plan: <<http://dnr.wi.gov>, key word "Wildlife Action Plan">
- Wisconsin Initiative on Climate Change Impacts: <<http://www.wicci.wisc.edu/>>
- Wisconsin Endangered and Threatened Species: <<http://dnr.wi.gov>, key word "endangered resources">
- Wisconsin Endangered and Threatened Species Permit: <<http://dnr.wi.gov>, key word "endangered species permit">
- Wisconsin Natural Heritage Inventory Working List Key: <<http://dnr.wi.gov>, key word "Natural Heritage Working List">

Funding

- Natural Resources Foundation of Wisconsin – <<http://www.wisconservation.org/>>
- USFWS State Wildlife Grants Program – <<http://wsfrprograms.fws.gov/subpages/grantprograms/swg/swg.htm>>

- Wisconsin Natural Heritage Conservation Fund
- Wisconsin DNR Division of Forestry

Contact Information (Wisconsin DNR Species Experts for Cerulean Warbler)

- [Mike Mossman](#), WI Department of Natural Resources, Bureau of Integrated Science Services (608-221-6346, michael.mossman@wi.gov)
- [Kim Grveles](#), WI Department of Natural Resources, Bureau of Natural Heritage Conservation (608-264-8594, kim.grveles@wisconsin.gov)

Endangered Resources Review Program Contacts

- General information (608-264-6057, DNRRERReview@wisconsin.gov)
- [Rori Paloski](#), Incidental Take Coordinator, Wisconsin DNR, Bureau of Natural Heritage Conservation (608-264-6040, rori.paloski@wi.gov)

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